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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,092	07/21/2003	Ezra J. Rapoport	14501-002001	6010
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			ART UNIT 2626	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/624,092	Applicant(s) RAPOPORT, EZRA J.	
	Examiner Justin W. Rider	Art Unit 2626	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 October 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-60 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-60 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Response to Amendment***

1. In response to the Office Action mailed 29 March 2007, applicant submitted a response filed 01 September 2007, in which the applicant amended claims 1, 3, 16, 20-21, 23, 33, 37, 39, 49 and 52 without adding new matter.

***Information Disclosure Statement***

2. The information disclosure statement(s) (IDS) submitted on 01 October 2007 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner has considered the information disclosure statement.

***Response to Arguments***

3. Applicant's arguments filed 01 October 2007 have been fully considered but they are not persuasive. Regarding the double patenting rejections discussed under Remarks on page 14, where the examiner believes that there is a certain level of similarity between claim 1 in both applications, after further review there are sufficient differences within the language. Therefore, the double patenting rejections are hereby withdrawn.

The examiner thanks applicant for making appropriate changes to the specification and claim dependencies.

The examiner thanks applicant for appropriately amending claims to more clearly define the claimed invention and so therefore, the 35 U.S.C. § 112 rejections are withdrawn.

Also, 35 U.S.C. § 101 issues are also withdrawn.

With respect to applicants remarks concerning claim 1 (REMARKS, page 17), applicant asserts that 'speech event feature signal' data is not sufficient to read on 'coefficient'. The examiner respectfully disagrees. First, 'coefficient' is a very broad term that, at this point could be assumed to represent any of a large number of characteristics pertaining to an input waveform. This is taking into consideration the claimed language, merely stating that the coefficients represent 'coefficients of the input waveform for each pitch segment'. Second, as applicant points out, **Atal** teaches wherein a speech event feature signal, 'corresponds to the features of the articulatory configuration of an individual sound occurring in the speech pattern.' In addition, looking at col. 13, lines 5-13, **Atal** further teaches:

*"The circuit of FIG. 2 is adapted to compress a spoken message into a sequence of coded speech event feature signals which are transmitted via utilization device 285 to a synthesizer. In the synthesizer, the speech event feature signals and the combining coefficients of the message are decoded and recombined to form the message log area parameter signals. These log area parameter signals are then utilized to produce a replica of the original message."*

Therefore, it is asserted by the examiner that the speech event feature signals are inherently equivalent to 'coefficients' for, at the least representing the original waveform in a way that makes them a fundamental part of encoded signal transmission that reconstructs the original signal.

With respect to applicants remarks concerning claim 16 (REMARKS, page 18), the examiner conceded that **Atal** fails to *specifically* disclose receipt of signal components, further asserting that it would have been inherent that if a signal has been sent, another component *must* receive it.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3, 5-8, 10-12, 21, 23, 25-28, 30-32, 37, 39, 41-44, and 46-48 are rejected under 35 U.S.C. 102(b) as being anticipated by **Atal (USPN 4,764,963)** referred to as **Atal hereinafter**.

Claims 1, 21, and 37: **Atal** discloses a method, apparatus and computer-readable medium for compressing speech data, comprising:

i. parsing an input waveform into pitch segments (col. 13, lines 22-27, ‘comprise a succession of pitch period and voiced/unvoiced signals generated responsive to the voice message,’);

ii. determining principal components of at least one pitch segment (col. 5, lines 33-35, ‘the principal components  $u_m(n)$  of the time frame is determined,’);

iii. sending to a receiver a subset of the determined principal components during an initial transmission period (Fig. 4 shows principal components being *sent* to a module in order to determine compact coefficients.); and

iv. sending to the receiver coefficients (speech event feature signal) of the input waveform for each pitch segment during a period subsequent to the initial transmission period, the coefficients being determined from the input waveform (col. 13, lines 5-8, 'coded speech event feature signals which are transmitted,').

Claims 3, 23, and 39: **Atal** discloses a method, apparatus and computer-readable medium as per claims 1, 21, and 37 above, further comprising:

- i. determining the number of pitch periods (col. 7, lines 45-48); and
- ii. generating a correlation matrix corresponding to the number of pitch periods (col. 7, lines 57-58).

Claims 5, 25, and 41: **Atal** discloses a method, apparatus and computer-readable medium as per claims 1, 21, and 37 above, further comprising determining coefficients for each pitch period (col. 4, lines 2-10).

Claims 6, 26, and 42: **Atal** discloses a method, apparatus and computer-readable medium as per claims 1, 21, and 37 above, further comprising determining the validity of principal components (col. 8, lines 54-65, 'speech event timing parameter signal (created from principal components) are read from store **245** (box **505**) and zero crossings (centroids) therein are detected... whenever a zero crossing is found, the speech event location frame is stored,').

Claims 7, 27, and 43: **Atal** discloses a method, apparatus, and computer-readable medium as per claims 6, 26, and 42 above, wherein determining if the principal components are

still valid comprises determining if a pitch segment exceeds a predetermined threshold (col. 8, lines 58-62, [zero crossings is the mark used to determine a valid set of signals]).

Claims 8, 28, and 44: **Atal** discloses a method, apparatus, and computer-readable medium as per claims 7, 27, and 43 above, wherein the predetermined threshold is a measure of a distance from a pitch segment to a centroid determined by the principal components (Abstract; col. 8, lines 50-52). Each negative going zero crossing represents the centroid, which, in turn, represents a predetermined threshold in which to determine the validity of signals.

Claims 10, 30 and 46: **Atal** discloses the method, apparatus and computer-readable medium as per claims 1, 21, and 37 above, further comprising reconstructing the input waveform (col. 13, lines 14-20).

Claims 11, 31, and 47: **Atal** discloses the method, apparatus and computer-readable medium as per claims 10, 30, and 46 above, further comprising:

i. scaling the principal components by the coefficients for each pitch segment to form scaled components (col. 11, lines 8-11, principal component signals  $u(n)$  from box **620** are weighted to form signals...'); and

ii. summing the scaled components (col. 11, lines 15-24, '...the loop including boxes **605**, **610**, **615**, **620**, **625**, and **630** is iterated so that the complete sequence of speech events for the speech pattern is formed.' [*emphasis added*]).

Claims 12, 32, and 48: **Atal** discloses the method, apparatus and computer-readable medium as per claims 10, 30, and 46 above, wherein reconstructing further comprises

i. concatenating reconstructed components of the input waveform (col. 13, lines 55-60);  
and

ii. using a smoothing filter while concatenating the reconstructed components (col. 13, lines 61-63).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2, 16-18, 20, 22, 33-36, 38, and 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Atal**.

Claims 2, 22, and 38: **Atal** discloses a method, apparatus and computer-readable medium as per claims 1, 21, and 37 above, however **Atal** discloses the use of five principal components (col. 9, lines 31-33) instead of six principal components. It would have been a suitable choice within the signal compression art to use five components as opposed to six components. Wherein applicant states that the number of ideal components (Specification, p. 15-16) would be between 5 and 10, it appears that the invention would perform equally well (>95% accuracy) with five principal components.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to use five principal components for the reasons above.

Claims 16, 33, and 49: **Atal** discloses a method, apparatus, and computer-readable medium of receiving an input waveform. However, **Atal** fails to distinctly disclose the receiving of a subset of principal components and coefficients. **Atal** does however disclose the

transmission of feature signals (col. 4, lines 61-64) that include the necessary components used to reconstruct the speech event feature signals (eqn. (5); col. 5, lines 41-60, e.g. principal components,  $u_m$ , and coefficients [or speech event features],  $b_{km}$ ).

Therefore, it would have been inherent within the scope of invention to receive signal components if a device transferred components after coding.

Claims 17, 34, and 50: **Atal** discloses the method, apparatus and computer-readable medium as per claims 16, 33, and 49 above, further comprising:

i. scaling the principal components by the coefficients for each pitch segment to form scaled components (col. 11, lines 8-11, principal component signals  $u(n)$  from box 620 are weighted to form signals...'); and

ii. summing the scaled components (col. 11, lines 15-24, '...the loop including boxes 605, 610, 615, 620, 625, and 630 is iterated so that the complete sequence of speech events for the speech pattern is formed.' [emphasis added]).

Claims 18, 35, and 51: **Atal** discloses the method, apparatus and computer-readable medium as per claims 16, 33, and 49 above, wherein reconstructing further comprises

i. concatenating reconstructed components of the input waveform (col. 13, lines 55-60); and

ii. using a smoothing filter while concatenating the reconstructed components (col. 13, lines 61-63).

Claim 20: Claim 20 is similar in scope and content to a combination of claims 1 and 16, and so is rejected under the same rationale.

Claim 36: Claim 36 is similar in scope and content to a combination of claims 21 and 33, and so therefore is rejected under the same rationale.

Claim 52: Claim 52 is similar in scope and content to a combination of claims 37 and 49, and so therefore is rejected under the same rationale.

8. Claims 4, 14-15, 24, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Atal** in view of **Chen et al. 'Karhunen-Loeve Method for Data Compression and Speech Analysis'**, pp. 377-380, October 1991 referred to as **Chen** hereinafter.

Claims 4, 24, and 40: **Atal** discloses a method, apparatus and computer-readable medium as per claims 1, 21, and 37 above, however failing to, but **Chen** does, specifically disclose ordering principal components (p. 377, Introduction, 'and ordered according to the magnitude of the associated eigenvalues.').

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Chen** in the method of **Atal** because good quality intelligible speech can be reproduced along with a higher compression rate (Abstract).

Claim 14: **Atal** discloses a method as per claim 1 above, however failing to, but **Chen** does, further disclose reducing the principal components to reduce the number of bits transmitted (p. 379, 'After the DC value  $AV_i$  is removed from each component,').

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Chen** in the method of **Atal** because good quality intelligible speech can be reproduced along with a higher compression rate (Abstract).

Claim 15: **Atal** discloses a method as per claim 1 above, however failing to, but **Chen** does, further disclose wherein an increased number of principal components to increase accuracy (p. 380, 'The largest ten eigenvalues (M=10) of the FB coefficients covariance matrix constitute 99.3% of the sum of the total 34 eigenvalues.'). This demonstrates a near perfect accuracy wherein 10 components are taken as opposed to six components. Applicant discloses in the specification (P. 15-16) that using between 5 and 10 principal components would allow a 95% reconstruction, wherein **Chen** is achieving 99.3%.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Chen** in the method of **Atal** because good quality intelligible speech can be reproduced along with a higher compression rate (Abstract).

9. Claims 9, 29, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Atal** in view of **Takebayashi et al. (USPN 5,761, 639)** referred to as **Takebayashi** hereinafter.

Claims 9, 29, and 45: **Atal** discloses a method, apparatus and computer-readable medium as per claims 7, 27 and 43 above, however failing to, but **Takebayashi** does, distinctly disclose the updating of principal components based on a predetermined criteria. **Atal** does disclose the use of thresholds to determine validity of principal component based samples; however, **Atal** merely stores certain components. **Takebayashi**, in an analogous art, discloses the updating of principal components for different words (i.e. significantly different speech patterns) (col. 12, lines 47-52).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Takebayashi** in the systems of **Atal** because it provides

an efficient method of recognizing speech in noisy or non-ideal environments in order to transmit a higher quality of speech signal to be reconstructed at the output (col. 1, lines 20-35).

10. Claims 13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Atal** in view of **Martin, R, 'Noise Power Spectral Density Estimation Based on Optimal Smoothing and Minimum Statistics', IEEE Transactions on Speech and Audio Processing, p. 504-512, 07/2001** referred to as **Martin** hereinafter.

Claims 13 and 19: **Atal** discloses a method for speech processing as per claims 12 and 18 above. However, where **Atal** further discloses the step of smoothing a signal to reduce discontinuities within a reconstructed signal, **Atal** fails to, but **Martin** does, disclose the use of a first-order (alpha-blending) filter in order to perform smoothing on a speech signal (p. 505, also eqn. 3).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Martin** in the method of **Atal** because the system minimizes speech distortions and unnatural sounding background noises, which plague speech processes under adverse conditions (p. 504, Introduction).

11. Claims 53 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Atal** in view of **Baker (USPN 4,713,778)** referred to as **Baker** hereinafter.

Claims 53 and 57: **Atal** discloses a method as per claims 1 and 16 above, however failing to, but **Baker** does, distinctly disclose comparing principal components generated from an input

waveform to a set of prestored speech patterns (col. 8, line 64 – col. 9, line 2) in order to recreate speech or text.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Baker** in the method of **Atal** because this reduces both computational cost and memory cost (col. 9, lines 1-2).

12. Claims 54 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Atal** in view of **Baker** as applied to claims 53 and 57 above, and further in view of **Carleton et al.** (USPN 6,069,940) referred to as **Carleton** hereinafter.

Claims 54 and 58: **Atal**, in view of **Baker** discloses the methods as per claims 53 and 57 above, however failing to, but **Carleton** does, disclose wherein phonemes are generated and converted from speech to text (col. 4, lines 24-38).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Carleton** in the method of **Atal** in view of **Baker** because it provides an increased method for navigating through telephone prompting systems (col. 2, lines 4-10).

13. Claims 55-56 and 59-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Atal** in view of **Farrett** (USPN 5,636,325) referred to as **Farrett** hereinafter.

Claims 55 and 59: **Atal**, in view of **Baker** discloses the methods as per claims 53 and 57 above, however failing to, but **Farrett** does, disclose wherein phonemes are generated and used to produce natural speech (Abstract).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Farrett** in the method of **Atal** because it produces speech from many different dialects (intonations) while minimizing storage requirements (col. 3, lines 23-25).

Claims 56 and 60: **Atal**, in view of **Baker** discloses the methods as per claims 53 and 57 above, however failing to, but **Farrett** does, disclose wherein speech parameters are altered in order to change intonations (dialects) according to user preferences (Abstract).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Farrett** in the method of **Atal** because it produces speech from many different dialects (intonations) while minimizing storage requirements (col. 3, lines 23-25).

### ***Conclusion***

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin W. Rider whose telephone number is (571) 270-1068. The examiner can normally be reached on Monday - Friday 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

J.W.R.  
30 November 2007

  
**DAVID HUDSPETH**  
SUPERVISORY PATENT EXAMINER  
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